THE ACTIVITY OF CELLULAR ANTIOXIDANT ENZYMES INDUCED IN SOLANUM SPECIES BY PHYTOPHTHORA INFESTANS

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One of the early plant defense responses to pathogens or their elicitors is the production of reactive oxygen species (ROS), termed oxidative burst. The ROS produced are assumed to play a key role in the integration of diverse strategies leading to disease resistance. On the other hand, cellular ROS accumulation should be strictly controlled, since they may exacerbate cell damage. We examined ROS production and cellular \( \text{H}_2\text{O}_2 \) content as well as changes in the activities of antioxidant enzymes – ascorbate peroxidase (APX), glutathione reductase (GR) and glutathione-S-transferase (GST) – induced by an elicitor (a culture filtrate of \textit{Phytophthora infestans}, CF) in the leaves of plants of \textit{Solanum} species, with different type and level of resistance against this pathogen. We studied: \textit{Solanum nigrum} – wild species, the non-host resistant to \( P. \) \textit{infestans}; \textit{Solanum tuberosum}: cv Bzura and clone H-8105 – polygenically resistant and susceptible to this pathogen, respectively.

The obtained results indicated that soon after the challenge, ROS production was lower in the resistant \textit{S. nigrum} and \textit{S. tuberosum} cv Bzura than in the susceptible clone H-8105. The hydrogen peroxide content in the CF-treated leaves of \textit{S. nigrum} remained equal to that in the untreated control. In the challenged leaves of \textit{S. tuberosum} cv Bzura and the clone H-8105, the levels of \( \text{H}_2\text{O}_2 \) were lower than in the respective controls. The activities of APX, GR and GST in CF-treated leaves (in comparison to those in the control) reached higher levels in susceptible \textit{S. tuberosum} clone H-8105 than in resistant \textit{S. nigrum}.

The differential responses of antioxidant enzymes in the resistant and susceptible plants suggest that antioxidative systems may be one of the factors determining the type of plant response to pathogen attack.